

REMARKS

Claims 16-26 are pending in the application with new claims 27-29 amended herein.

Applicants traverse the grounds for rejection of all claims.

Claims 16-26 stand rejected under 35 USC 103(a) as being unpatentable over Kitamura in view of Fukuzumi. Applicants request reconsideration. Applicants note that page 2 of the Office Action does not specifically reject claim 21. However, to advance prosecution, Applicants assume that the Office intended to reject claim 21. The Office Action Summary lists claim 21 as rejected and grounds for rejection of claim 21 are stated on page 3 of the Office Action.

Claim 16

Amended claim 16 sets forth a capacitor construction that includes, among other features, a surface area enhancement layer over a substrate, a first capacitor electrode over the enhancement layer, a capacitor dielectric layer over the first electrode, and a second capacitor electrode over the dielectric layer. The enhancement layer has an outer surface area per unit area that is greater than an inner surface area per unit area of the enhancement layer. The first electrode has an inner surface area per unit area and an outer surface area per unit area that are both greater than an outer surface area per unit area of the substrate. The first electrode does not comprise the enhancement layer.

Kitamura And Fukuzumi Fail To Suggest The Claimed Enhancement Layer

Kitamura fails to suggest the enhancement layer. The Applicants herein incorporate by reference the entire remarks in the previous Response to July 30, 2002 Office Action with regard to rejection of claim 16 over Kitamura and over Kitamura in view of Fukuzumi. The present Office Action, including the Response to Arguments on pages 5-6, persists in erroneously finding that doped outer layer 2A may be undoped.

It is immaterial to an issue of obviousness if all the elements of a claimed combination are old in another context. What must be found obvious to defeat allowability of a patent claim is the underlying claimed combination. See, Kimberly-Clark Corp. v. Johnson & Johnson, 745 F.2d 1437, 1448, 223 USPQ 603, 609-10 (Fed. Cir. 1984.) Further, the text of 35 U.S.C. § 103(a) requires that "the subject matter as a whole" must have been obvious at the time the invention was made. Claim 16 sets forth a capacitor construction that includes an enhancement layer, a first electrode, a dielectric layer, and a second electrode. The Office is required to consider the claimed capacitor construction "as a whole." Kitamura does not suggest any capacitor construction including doped outer layer 2A as undoped. Page 5 of the Office Action improperly relies upon paragraph [0051] of Kitamura as allegedly disclosing doped outer layer 2A being undoped. However, Kitamura never discloses any capacitor construction, such as claimed, including doped outer layer 2A as undoped. Rather, undoped polysilicon film is formed as shown in Fig. 2C of Kitamura and subsequently doped by introducing an impurity prior to inclusion of such material in any capacitor construction.

Since the express text of Kitamura requires doped outer layer 2A to be doped in a capacitor construction, the Office is forced to consider the "first electrode" of Kitamura as including both doped outer layer 2A and doped inner layer 2C. Accordingly, page 6 of the Office Action admits that Kitamura does not disclose the claimed enhancement layer and relies upon Fukuzumi's silicon oxide film 6 formed over polysilicon film 4 as allegedly disclosing the claimed enhancement layer. However, such a finding fails to consider claim 16 "as a whole" as is required.

Fukuzumi fails to suggest the enhancement layer. As stated above, claim 16 sets forth a capacitor construction that includes an enhancement layer, a first electrode, a dielectric layer, and a second electrode. Fukuzumi does not disclose such a capacitor construction that includes the claimed enhancement layer. Rather, silicon oxide film 6 of Fukuzumi only appears in Figs. 3 and 4, neither of which suggest the claimed capacitor construction. As shown in Figs. 5 and 6 of Fukuzumi and described in paragraph [0079] silicon oxide film 6 is intentionally removed and is never included in any capacitor construction having first and second electrodes and a dielectric layer therebetween, as claimed. Accordingly, both Kitamura and Fukuzumi fail to disclose or suggest the claimed enhancement layer. A finding of obviousness requires that the art suggest every claimed limitation and the art fails this requirement.

Page 6 of the Office Action newly refers to Figs. 31-34 of Fukuzumi and the associated text alleges that metal film 52 discloses a HSG layer and polysilicon film 51 discloses an enhancement layer. Such allegation is made for the first time in the final

rejection and has not earlier been presented by the Office. Even so, Applicants note that metal film 52 is only disclosed in paragraph [0136] of Fukuzumi as including Ru or Pt. Metal film 52 is not suggested as including HSG, as alleged. Applicants further note that claim 16 sets forth that the first electrode does not comprise the enhancement layer. In contrast, paragraph [0135] expressly states that "polysilicon film 51 forms part of the lower electrode of a capacitor." Accordingly, the newly relied upon text of Fukuzumi also fails to disclose or suggest every element of claim 16.

Kitamura Fails To Suggest The Claimed First Electrode

Claim terms must be interpreted in light of the present specification, not in light of the cited art. In addition, the Office Action persists in erroneously relying upon Kitamura and/or Fukuzumi for a definition of the terms of claim 16. Page 5 of the Office Action alleges the Applicants previously asserted that "the inner and outer surface of electrode layer [sic] is not defined" and page 6 relies upon Kitamura and Fukuzumi as allegedly defining the inner and outer surfaces. A complete reading of Applicant's assertions regarding interpretation of the claim terms "inner surface area per unit area" and "outer surface area per unit area" on pages 5-8 of the previous Response to July 30, 2002 Office Action is required. A complete reading reveals that the present Office Action misstates Applicant's prior assertions and has not yet grasped the well known requirement imposed upon the Office to interpret claim terminology in light of the specification, rather than in light of the cited art.

It is entirely improper for the Office to state on page 6 of the Office Action that claim terms can be defined using the disclosure of Kitamura and Fukuzumi. In determining patentability of claim 16, it is entirely irrelevant how Kitamura and/or Fukuzumi may define the terms "inner surface" and/or "outer surface." It is likewise improper for page 6 of the Office Action to state that Kitamura teaches that "the electrode surface area are [sic] larger than the surface of the substrate area" since claim 16 expressly sets forth "surface area per unit area." In determining patentability of claim 16, it is entirely irrelevant what Kitamura and/or Fukuzumi may disclose regarding surface area (i.e. total surface area, as apparently intended by the Office) rather than "surface area per unit area," since claim 16 clearly sets forth such terms and they are described in the specification.

Accordingly, the Office is required to interpret claim 16 by considering the entirety of the claim terms and determining the meaning of such terms in light of the present specification. Pages 5-8 of the previous Response to July 30, 2002 Office Action, particularly page 7, describe how the claim terms should be interpreted by relying upon the present specification.

Once the Office has arrived at a proper definition of the terms, such definition should be applied to the cited art to determine whether the art discloses the claimed capacitor construction. It is irrelevant in reviewing the cited art for the claimed invention how the cited art may or may not define terms such as "inner" and "outer." The Office must interpret such claim terms in accordance with the manner expressly used in the subject claims viewed in light of the present specification.

Kitamura does not suggest the claimed surface area relationships of the first electrode. Thus, in keeping with Applicant's assertions herein and those incorporated by reference, Kitamura fails to disclose or suggest a first capacitor electrode over the enhancement layer, the first electrode having an inner surface area per unit area and an outer surface area per unit area that are both greater than an outer surface area per unit area of the substrate. It is irrelevant that page 6 of the Office Action alleges "it is well known in the art to increase a dimension of the surface area of a capacitor" since the art does not disclose or suggest the claimed structure of a first capacitor electrode. At least for such additional reasons, the cited art fails to suggest every element of claim 16.

The Dependent Claims Are Patentable.

Claims 17-21 depend from claim 16 and are patentable at least for such reason as well as for the additional limitations of such claims not disclosed or suggested. For example, claim 21 sets forth that the outer surface area of the first electrode is at least 30% greater than the substrate outer surface area. Page 4 of the Office Action confusingly discusses the thickness of the first electrode rather than the outer surface area per unit area. Applicants assert that the discussion that follows on page 4 of the Office Action regarding routine optimization is thus inapplicable to the surface area limitations set forth in claim 21.

Claims 22-26

Claim 22 sets forth a capacitor construction that includes, among other features, an opening in an insulative layer over a substrate, a HSG polysilicon layer over sides of the opening but not over a bottom of the opening, a conformal first capacitor electrode on the polysilicon, a capacitor dielectric layer on the first electrode, and a second capacitor electrode over the dielectric layer. The first electrode is sufficiently thin that it has a rugged outer surface with an outer surface area per unit area greater than an outer surface area per unit area of the substrate underlying the first electrode.

Fukuzumi fails to suggest the claimed opening in an insulative layer. Pages 3-4 of the Office Action persists in the erroneous conclusions regarding the teachings of Fukuzumi against which the Applicants previously argued. Applicants herein incorporate by reference the entire remarks with regard to rejection of claim 22 from the previous Response to July 30, 2002 Office Action. Page 3 of the Office Action still erroneously states that Fukuzumi discloses an opening "in an insulating layer 4" allegedly appearing in Figs. 2-6. In fact, layer 4 is only described in paragraph [0079] and elsewhere throughout Fukuzumi as "polysilicon film 4." The Office reaches the mistaken conclusion that polysilicon film constitutes an insulative layer. Accordingly, it is entirely clear to those of ordinary skill that Fukuzumi fails to suggest the claimed opening in an insulative layer.

Fukuzumi fails to suggest the claimed HSG layer. Page 3 of the Office Action also erroneously alleges that Figs. 2-6 suggest the claimed HSG polysilicon layer over the sides

of the opening but not over the bottom. The Office again apparently considers polysilicon film 4, as shown in Fig. 4, to disclose the claimed HSG layer. However, as clearly established above with regard to claim 16, the Office is required to consider the limitations of claim 22 as a whole. Claim 22 sets forth a capacitor construction that includes an insulative layer, a HSG layer, a first electrode, a dielectric layer, and a second electrode. By comparison, Fig. 4 of Fukuzumi does not disclose the capacitor construction of claim 22. Further, as shown in Figs. 5 and 6 of Fukuzumi and described in paragraph [0079], polysilicon film 4 is removed and is never comprised by any capacitor construction. The HSG layer of claim 22 is clearly comprised by a capacitor construction having a first electrode, a dielectric layer, and a second electrode. Thus, it is impossible for Fig. 4 of Fukuzumi to suggest the claimed capacitor construction, as a whole.

The cited combination does not suggest claim 22. Page 3 of the Office Action admits that Kitamura fails to disclose a HSG layer over the sides of an opening in an insulative layer but not over a bottom of the opening. As established by the Applicants previously and again herein, Fukuzumi fails to suggest the claimed limitation at least since polysilicon film 4 is not over the sides of an insulative layer opening and additionally because polysilicon 4 is never comprised by a capacitor construction, as claimed. Thus, both Kitamura and Fukuzumi are deficient in the same respect and combination of such references cannot be considered to disclose or suggest claim limitations absent from both. Claim 22 is thus patentable over Kitamura in view of Fukuzumi.

Claims 23-26 are patentable. Claims 23-26 depend from claim 22 and are patentable at least for such reason as well as for the additional limitations of such claims not disclosed or suggested. At least for the reason discussed herein and incorporated herein by reference, claims 16-26 are patentable over the cited art. Applicants request allowance of such claims in the next Office Action.

Conclusion

New claims 27-29 are added by the present amendment. Applicants assert that review of such claims reveals that they are additionally patentable over all of the cited references considered alone or in combination, as will be readily appreciated from the discussions above regarding the deficiencies of such art as applied to claims 16-26.

Applicants previously requested in the Response to the July 30, 2002 Office Action that the Examiner initial the A.W. Ott, et al article listed under Other References in a copy of a Form PTO-1449 previously received. The subject PTO-1449 was again included with the present Office Action. However, the A.W. Ott, et al article still has not been initialed by the Examiner as considered.

The Office also returned a copy of a Form PTO-1449 filed on May 8, 2002 with a Supplemental IDS. However, none of the references listed in the PTO-1449 are initialed as considered.

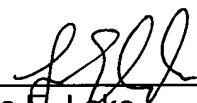
No explanation is provided in the Office Action as to why the Office persists in failing to initial the cited references as considered. Applicants once again request consideration

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of the cited references and return of a properly initialed Form PTO-1449 indicating such consideration.

Respectfully submitted,

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